PATENT
U.S. Serial No. 09/336,090
Docket No. 0023-0115

REMARKS

In the Office Action, the Examiner objected to the drawings for a minor informality; rejected claims 1-3, 11, 12, 17, 18, 20, and 21 under 35 U.S.C. § 102(b) as anticipated by Cotton et al. (U.S. Patent No. 5,255,264); rejected claim 4 under 35 U.S.C. § 103(a) as unpatentable over Cotton et al. in view of Chalmers et al. (U.S. Patent No. 6,052,364); and rejected claims 5-10, 13-16, 19, and 22-26 under 35 U.S.C. § 103(a) as unpatentable over Cotton et al. in view of Gupta et al. (U.S. Patent No. 6,272,151).

By this Amendment, Applicants propose amending Figs. 1 and 3 of the drawings, amend the specification to improve form, and amend claims 1, 4, 9, 17, and 19-26 to improve form. Applicants submit that claims 4, 9, 17, and 19-26 have not been narrowed by these amendments. No new matter has been added by this Amendment. Applicants respectfully traverse the Examiner's rejections. Claims 1-26 remain pending.

In paragraph 6 of the Office Action, the Examiner objected to the drawings under 37 C.F.R. § 1.84 because a certain reference number described in the specification is not shown in the drawings. Applicants propose amending Figs. 1 and 3 to include reference numbers 100 and 202g, respectively. No new matter has been added. Reference number 100 is described in the specification in connection with Fig. 1 at page 12. Reference number 202g is described in the specification in connection with Fig. 3 at page 14. In view of the foregoing, Applicants respectfully request that the objection to the drawings be reconsidered and withdrawn.

In paragraph 2 of the Office Action, the Examiner rejected claims 1-3, 11, 12, 17, 18, 20, and 21 under 35 U.S.C. § 102(b) as allegedly anticipated by Cotton et al. Applicants respectfully traverse the rejection.

Cotton et al. discloses a switching network for interconnecting various types of voice or data equipment and telephone lines (col. 4, lines 22-24). The switching network includes four stages: the first two stages are in terminal units that provide an entry point to the switching network for telephone lines and terminal equipment, and the third and fourth stages are located on individual switch planes (col. 4, lines 25-33).

By contrast, the present invention recited in amended claim 1, for example, includes a combination of features of an interconnect network for operation within a communication node. The interconnect network includes a plurality of local line card modules, a selectable number of local interconnect modules, and an expanded interconnect module. The local line card modules are configured to process information received at a plurality of speeds and formatted according to a plurality of protocols. The selectable number of local interconnect modules are connected to the local line card modules and located proximate to each other. Each of the local interconnect modules includes local transfer elements for transferring information between a plurality of local I/O channels and for transferring information between the plurality of local I/O channels and a plurality of non-local I/O channels. The expanded interconnect module is located proximate to the local interconnect modules and includes coupling means for electrically coupling to the non-local I/O channels, and expanded transfer elements for transferring information between the local interconnect modules.

A proper rejection under 35 U.S.C. § 102 requires that a single reference teach every aspect of the claimed invention either expressly or impliedly. Any feature not directly taught must be inherently present. See M.P.E.P. § 2131. Cotton et al. does not disclose or suggest each of the features recited in amended claim 1. For example, Cotton et al. does not disclose a plurality of local line card modules that are configured to process information received at a plurality of speeds and formatted according to a plurality of protocols. Because Cotton et al. does not disclose local line card modules, Cotton et al. cannot be relied upon for disclosing a selectable number of local interconnect modules that connect to the local line card modules, as recited in claim 1.

If the Examiner persists with the rejection of claim 1 based on Cotton et al., Applicants respectfully request that the Examiner, at a minimum, address each of the features of the claim. For example, in rejecting original claim 1, the Examiner never addressed the expanded interconnect module.

For at least these reasons, Applicants submit that claim 1 is not anticipated by Cotton et al.

Claims 2, 3, 11, 12, 17, and 18 depend from claim 1 and are, therefore, not anticipated by Cotton et al. for at least the reasons given with regard to claim 1. Claims 2, 3, 11, 12, 17, and 18 are also not anticipated by Cotton et al. for reasons of their own.

For example, claim 2 recites that the local transfer elements include means for synchronizing information transferred between each of the local transfer elements. Cotton et al. does not disclose or suggest this feature. The Examiner alleged that Cotton et al. discloses

"synchronization with Channel 0, where it is a portion of a data format diagram from (Fig. 2) and could be used for synchronizing between expanded or local transfer elements" (emphasis added) (Office Action, paragraph 2). As explained above, for a proper rejection under 35 U.S.C. § 102, each and every feature of the claimed invention must be taught either expressly or impliedly (M.P.E.P. § 2131). This does not include features that "could be" used for allegedly performing a claimed feature.

At column 7, lines 52-54, Cotton et al. discloses "Channel 0 of each frame includes synchronizing information and may include clocking information." Whether the synchronization information is allegedly used for synchronizing between expanded or local transfer elements is a matter of mere speculation by the Examiner. In fact, the Examiner's assertion is based on improper hindsight reasoning, which cannot be relied upon when establishing a rejection under 35 U.S.C. § 102. Accordingly, Applicants submit that this is an improper rejection under 35 U.S.C. § 102 and withdrawal of the rejection is respectfully requested. For at least these additional reasons, Applicants submit that claim 2 is not anticipated by Cotton et al.

Claim 3 recites that the expanded transfer elements include means for synchronizing information transferred between the local interconnect modules. Cotton et al. does not disclose or suggest this feature. The Examiner alleged that Cotton et al. discloses "synchronization with Channel 0, where it is a portion of a data format diagram from (Fig. 2) and could be used for synchronizing between expanded or local transfer elements" (emphasis added) (Office Action, paragraph 2). As explained above, for a proper rejection under 35 U.S.C. § 102, each and every

feature of the claimed invention must be taught either expressly or impliedly (M.P.E.P. § 2131). This does not include features that "could be" used for allegedly performing a claimed feature.

At column 7, lines 52-54, Cotton et al., as discussed above, discloses "Channel 0 of each frame includes synchronizing information and may include clocking information." Whether the synchronization information is allegedly used for synchronizing between expanded or local transfer elements is a matter of mere speculation by the Examiner. In fact, the Examiner's assertion is based on improper hindsight reasoning, which cannot be relied upon when establishing a rejection under 35 U.S.C. § 102. Accordingly, Applicants submit that this is an improper rejection under 35 U.S.C. § 102 and withdrawal of the rejection is respectfully requested. For at least these additional reasons, Applicants submit that claim 3 is not anticipated by Cotton et al.

Claim 11 recites redundancy generating means for generating an alternative version of information being transferred out of the interconnect network through the local I/O channels. Cotton et al. does not disclose or suggest this feature. The Examiner alleged that Cotton et al. discloses "a network with redundant switching capabilities" and cited column 6, lines 42-45, of Cotton et al. for support (Office Action, paragraph 2). This is not, however, what is recited in claim 11. Instead, claim 11 recites means for generating "an alternative version of information." Cotton et al. does not disclose or suggest this feature. For at least these additional reasons, Applicants submit that claim 11 is not anticipated by Cotton et al.

Claim 12 recites, among other things, that the redundancy generating means is adapted for causing the alternative version of the information to be a bit-by-bit exclusive-or between

pairs of groups of information words included in an information cell. Cotton et al. does not disclose or suggest these features. The Examiner alleged that "it is inherent that a redundancy generating means use an exclusive-or operation for bit-by-bit groups of information words" (Office Action, paragraph 2).

According to M.P.E.P. § 2112,

> To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.

The Examiner has not met the requisite burden of proof for establishing inherency. Instead, the Examiner made a mere allegation that certain features were inherent. For at least these additional reasons, Applicants submit that claim 12 is not anticipated by Cotton et al.

Claim 17 recites that the expanded interconnect module includes array means for storing path information representative of a plurality of paths through the expanded transfer elements over which information from a first local I/O channel of one of the local interconnect modules can be transferred to a second local I/O channel of another one of the local interconnect modules, and index means for selecting appropriate path information from the array means, at least partially in response to a destination address of the second local I/O channel. Cotton et al. does not disclose or suggest these features.

The Examiner alleged that "Cotton teaches in the (Abstract) of the specification: an array with memory, Cotton teaches an index means for path information regarding a destination address" (Office Action, paragraph 2). This is not, however, what is recited in claim 17. Instead,

claim 17 recites array means for storing path information and index means for selecting appropriate path information from the array means. Cotton et al. does not disclose or suggest these features. For at least these additional reasons, Applicants submit that claim 17 is not anticipated by Cotton et al.

Claim 18 recites that the local transfer elements and the expanded transfer elements are substantially identical. Cotton et al. does not disclose or suggest this feature. The Examiner alleged that "it is inherent to have an interconnect network where transfer elements are substantially identical." Again, this is not what is recited in claim 18. Instead, claim 18 recites that the local transfer elements and the expanded transfer elements are substantially identical. For at least these additional reasons, Applicants submit that claim 18 is not anticipated by Cotton et al.

Independent claim 20 recites a combination of features of a dynamically scalable communication interconnect. The interconnect includes a selectable number of local interconnects and a single expanded interconnect. Each of the local interconnects includes associated transfer elements for transferring information through the associated local interconnect. The expanded interconnect includes elements for coupling to the selected number of local interconnects and expanded transfer elements for transferring information between the local interconnects. The selected number of local interconnects can be varied while the expanded interconnect is transferring information.

Cotton et al. does not disclose or suggest each of the features recited in claim 20. For example, Cotton et al. does not disclose that the selected number of local interconnects can be

varied while the expanded interconnect is transferring information. The Examiner did not address this feature.

For at least these reasons, Applicants submit that claim 20 is not anticipated by Cotton et al.

Claim 21 recites features similar to the features described above with regard to claims 1, 11, and 12. Claim 21 is, therefore, not anticipated by Cotton et al., for at least reasons similar to those provided above with regard to claims 1, 11, and 12.

In paragraph 4 of the Office Action, the Examiner rejected claim 4 under 35 U.S.C. § 103(a) as allegedly unpatentable over Cotton et al. in view of Chalmers et al. Applicants respectfully traverse the rejection.

Chalmers et al. discloses a briefcase size, portable satellite terminal that uses C/Ku band and spread spectrum technology to reduce the antenna and terminal sizes (col. 2, lines 59-62).

Claim 4 depends from claim 1. The disclosure of Chalmers et al. provides nothing to cure the deficiencies in the disclosure of Cotton et al. noted above with regard to claim 1. Therefore, claim 4 is patentable over Cotton et al. and Chalmers et al., whether taken alone or in any reasonable combination, for at least the reasons given with regard to claim 1.

Further, Chalmers et al. is directed to a totally non-analogous field from Cotton et al. Chalmers et al. is directed to a portable satellite-based terminal (col. 1, lines 5-7), whereas, Cotton et al. is directed to multi-line telephone systems (col. 1, lines 8-10). Applicants submit that one skilled in the art with knowledge of the Cotton et al. disclosure would not have been

motivated to combine the features of Chalmers et al. with the features of Cotton et al., without the benefit of Applicants' disclosure.

For at least these reasons, Applicants submit that claim 4 is patentable over Cotton et al. and Chalmers et al., whether taken alone or in any reasonable combination.

In paragraph 5 of the Office Action, the Examiner rejected claims 5-10, 13-16, 19, and 22-26 under 35 U.S.C. § 103(a) as allegedly unpatentable over Cotton et al. in view of Gupta et al. Applicants respectfully traverse the rejection.

Gupta et al. discloses a scalable multimedia network that provides integrated networking of data, voice, video, and image services over a variety of access facilities including metallic loops, fiber/coax, and digital fiber (col. 1, lines 41-44).

Claims 5-10, 13-16, and 19 depend from claim 1. The disclosure of Gupta et al. provides nothing to cure the deficiencies in the disclosure of Cotton et al. described above with regard to claim 1. Therefore, claims 5-10, 13-16, and 19 are patentable over Cotton et al. and Gupta et al., whether taken alone or in any reasonable combination, for at least the reasons given with regard to claim 1. Claims 5-10, 13-16, and 19 are also patentable over Cotton et al. and Gupta et al. for reasons of their own. Some of these reasons are discussed below with regard to claims 22-26.

Independent claim 22 recites, among other things, quality of service means for differentiating between information coupled into the local I/O channels based on an associated priority of the information, and for indicating unavailability for receiving information having a particular associated priority on one or more of the local I/O channels. Neither Cotton et al. nor

Gupta et al., whether taken alone or in any reasonable combination, discloses or suggest these features.

The Examiner alleged that Gupta et al. discloses "QoS means and dynamic scaling of bandwidth for a selectable number of nodes" and cited column 5, lines 3-9, of Gupta et al. for support (Office Action, paragraph 5). At column 5, lines 3-9, Gupta et al. discloses:

> The RGW has enough bandwidth handling capacity such that the desired service sessions can flow through while meeting desired QOS requirements. Since there can be multiple service sessions co-existing simultaneously, and they can be set up and torn down asynchronously, the RGW performs statistical multiplexing. The RGW 16 is remotely controlled, provisioned and maintained by the SMN 14.

Nowhere in this section does Gupta et al. disclose differentiating between information coupled into local I/O channels based on an associated priority of the information, and indicating unavailability for receiving information having a particular associated priority on one or more of the local I/O channels, as recited in claim 22. The disclosure of Cotton et al. provides nothing to cure these deficiencies in the disclosure of Gupta et al.

For at least these reasons, Applicants submit that claim 22 is patentable over Cotton et al. and Gupta et al., whether taken alone or in any reasonable combination.

Independent claim 23 recites, among other things, that the interconnect network is adapted for transferring information as information cells, and the local and expanded transfer elements further include clumping means for substantially simultaneously transferring a plurality of the information cells. Neither Cotton et al. nor Gupta et al., whether taken alone or in any reasonable combination, discloses or suggest these features.

The Examiner alleged that Gupta et al. discloses "the addition of SMN broadcasts being described as cells transmitted across buses that use parallel processing" and "a plurality of cells being transferred simultaneously" and cited column 5, lines 59-63, of Gupta et al. for support. At column 5, lines 59-63, Gupta et al. discloses:

> The SMN is a broadcast switch using tiered system buses, Tier-0, Tier-1 and Tier-2, as shown in FIG. 2. Physically, the system buses can be broken down into different tiers, each one running at a different rate. The Tier-0 bus 51 consists of four independent 16-bit parallel buses.

Nowhere in this section does Gupta et al. disclose local and expanded transfer elements that include clumping means for substantially simultaneously transferring a plurality of information cells, as recited in claim 23. The disclosure of Cotton et al. provides nothing to cure these deficiencies in the disclosure of Gupta et al.

For at least these reasons, Applicants submit that claim 23 is patentable over Cotton et al. and Gupta et al., whether taken alone or in any reasonable combination.

Independent claims 24 and 25 recite, among other things, a selectable number of local communication modules, a local interconnect module, and an expanded interconnect module of a dynamically bandwidth scalable communication node. Neither Cotton et al. nor Gupta et al., whether taken alone or in any reasonable combination, discloses or suggest these features.

The Examiner did not address each of these features and, therefore, did not establish a prima facie case of obviousness with regard to claims 24 and 25. In particular, the Examiner did not address the selectable number of communication modules or the expanded interconnect module.

With regard to claims 24 and 25, the Examiner alleged that Gupta et al. discloses "QoS means and dynamic scaling of bandwidth for a selectable number of nodes" and cited column 5, lines 3-9, of Gupta et al. for support (Office Action, paragraph 5). These features are not recited in claims 24 or 25.

For at least these reasons, Applicants submit that claims 24 and 25 are patentable over Cotton et al. and Gupta et al., whether taken alone or in any reasonable combination.

Independent claim 26 recites, among other things, scaling bandwidth of the interconnect network by including a selected number of the local interconnect modules in the plurality of local interconnect modules. Neither Cotton et al. nor Gupta et al., whether taken alone or in any reasonable combination, discloses or suggest these features.

The Examiner alleged that Gupta et al. discloses "QoS means and dynamic scaling of bandwidth for a selectable number of nodes" and cited column 5, lines 3-9, of Gupta et al. for support (Office Action, paragraph 5). At column 5, lines 3-9, Gupta et al. discloses:

> The RGW has enough bandwidth handling capacity such that the desired service sessions can flow through while meeting desired QOS requirements. Since there can be multiple service sessions co-existing simultaneously, and they can be set up and torn down asynchronously, the RGW performs statistical multiplexing. The RGW 16 is remotely controlled, provisioned and maintained by the SMN 14.

Nowhere in this section does Gupta et al. disclose scaling bandwidth of the interconnect network by including a selected number of the local interconnect modules in the plurality of local interconnect modules, as recited in claim 26. The disclosure of Cotton et al. provides nothing to cure these deficiencies in the disclosure of Gupta et al.

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For at least these reasons, Applicants submit that claim 26 is patentable over Cotton et al. and Gupta et al., whether taken alone or in any reasonable combination.

In view of the foregoing amendments and remarks, Applicants respectfully request the Examiner's reconsideration of the application and the timely allowance of pending claims 1-26.

If the Examiner does not believe that all pending claims are now in condition for allowance, the Examiner is urged to contact the undersigned to expedite prosecution of this application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES

IN THE SPECIFICATION:

The specification has been amended as follows:

The paragraph beginning at page 1, line 6, has been amended as follows:

This application claims the benefit of priority under 35 U.S.C. 119(e) to US Provisional Application Serial No. 60/090,028, filed June 19, 1998, and is related to US Patent Application No. 09/237,128, filed January 25, 1999, and entitled "NETWORK PACKET FORWARDING LOOKUP WITH A REDUCED NUMBER OF MEMORY ACCESSES," US Patent Application No. [_____] 09/336,311, filed June [__] 18, 1999, and entitled "A QUALITY OF SERVICE FACILITY IN A DEVICE FOR PERFORMING IP FORWARDING AND ATM SWITCHING," US Patent Application No. [_____] 09/336,229, filed June [__] 18, 1999, and entitled "DEVICE FOR PERFORMING IP FORWARDING AND ATM SWITCHING," and US Patent Application No. [_____] 09/335,947, filed June [__] 18, 1999, and entitled "METHOD AND SYSTEM FOR ENCAPSULATING/DECAPSULATING DATA ON A PER CHANNEL BASIS IN HARDWARE". The entire contents of each of [said application is] the applications are hereby incorporated by reference.

The paragraph beginning at page 3, line 17, has been amended as follows:

Accordingly, [it is an object of the invention to provide] in an aspect consistent with the principles of the invention, there is provided an interconnect network that enables a multi-service

communication node to handle a variety of communication protocols, without requiring the maintenance of costly parallel networks.

The paragraph beginning at page 3, line 21, has been amended as follows:

[It is a further object of the invention to provide] In accordance with another aspect consistent with the principles of the invention, there is provided an interconnect network that enables a communication node to adapt to communication protocols employed by emerging technologies.

The paragraph beginning at page 3, line 25, has been amended as follows:

[Another object of the invention is to provide] In accordance with yet another aspect consistent with the principles of the invention, there is provided a scalable interconnect network enabling bandwidth scaling of a communication node to fit the needs of providers having varying bandwidth requirements.

The paragraph beginning at page 3, line 29, has been amended as follows:

[An additional object of the invention is to provide] In accordance with a further aspect consistent with the principles of the invention, there is provided a fault-tolerant interconnect network capable of repair and update, without causing down-time or compromising operation of the communication node.

The paragraph beginning at page 4, line 1, has been amended as follows:

These and other [objects] aspects of the invention will be [apparent] described with respect to the following description of the invention.

The paragraph beginning at page 11, line 27, has been amended as follows:

Another [important] feature of the invention is dynamic bandwidth scalability. A communication node employing interconnection networks according to an illustrative embodiment of the invention, employs a modular design. The modular design enables a service provider to change the number of communication channels by adding or subtracting physical proximately located modules to or from the communication node. According to [a preferred] one embodiment, the modules include a plurality of I/O interfaces coupled to an associated interconnection network. In a further embodiment of the invention, the communication node employs a two-level interconnection network modularity; a local level and an expanded level. More particularly, a plurality of local interconnection network modules, preferably proximately located with respect to each other, couple to an expanded interconnection network, also preferably located proximate to the local interconnection modules. By changing the number of local interconnection network modules that are "plugged-in" to the expanded interconnection module, a service provider can change the bandwidth of the communication node. Moreover, according to a further embodiment, a service provider can connect and unconnect local interconnect modules while the communication node is operating transferring information, thus, providing dynamic bandwidth scalability.

The paragraph beginning at page 14, line 16, has been amended as follows:

The local line card module 102 includes eight local line cards 202-216. Local line cards 202-216 are printed circuit boards holding integrated circuits and other components. Each line card 202-216 has six internal (I/O) ports 202a-202f, and an external SONET I/O port 202g. Line card 202 couples information between external I/O port 202g and internal I/O ports 202a-202f. External I/O port 202g couples information into and out of the node 200, and the internal I/O ports 202a-202f connect with up to forty-eight internal communication lines [217] and couple information between the local line card module 102 and the local interconnect module 118. Typically, each internal I/O port a-f includes a Gigabit Ethernet transceiver, providing a Gigabit Ethernet input channel and a Gigabit Ethernet output channel. Preferably, the input and output channels provide 10-bits of information. However, it should be noted that the term transceiver, as used throughout this description, is also intended to encompass structures including separate receivers and transmitters. The external I/O port 202g is preferably software configurable for either SONET or SDH operation. Thus, physical interfaces are software configurable for OC48 or STM16. SONET and SDH PAMS may be freely intermixed within access module 142. A fully loaded local line card module 102 can have up to eight external SONET/SDH I/O ports and forty-eight corresponding internal I/O ports.

The paragraph beginning at page 20, line 13, has been amended as follows:

In operation, and as illustrated in TABLE 1 above, the communication node 200 transfers each 16-byte group over a different internal communication channel. By way of example and referring again to FIGURE 3, assume each line card 202-216 has an associated address, and information enters line card 202 by way of external port 202g. Assume further that the entering information has a destination address of line card 208. As shown in FIGURE 2, internal port 202a couples a first 16-byte group to internal port 0a of interconnect board 218. Internal port 202b couples a second 16-byte group to internal port 0b of board 218. Internal port 202c couples a third 16-byte group to internal port 0a of board 220, and internal port 202d couples a fourth 16-byte group to internal port 0b of board 220. Internal port 0a of board 218 couples the first 16-byte group to ASIC 224a. Internal port 0b of board 218 couples the second 16-byte group to ASIC 224b. Internal port 0a of board 220 couples the third 16-byte group to ASIC 226a, and internal port 0b of board 220 couples the fourth 16-byte group to ASIC 226b.

The paragraph beginning at page 23, line 16, has been amended as follows:

The expanded interconnect module 134 includes three essentially identical expanded interconnect boards 136-140. Each board 136-140 includes, among other components, one hundred and twenty-eight Gigabit Ethernet transceivers. Each board 136-140 also includes four ASICs 402-408, 410-416, and 418-424, respectively. ASICs 402-424 are essentially identical to ASICs 224-228. However, ASICs [404] 402-424 are mode selected to operate in an expanded interconnect mode, rather than the local interconnect mode of ASICs 224-228. As in the case of ASICs 224-228, [ASICS 404] ASICs 402-424 each logically subdivides into an a-half and a b-

half. Each half includes sixteen Gigabit Ethernet I/O ports, wherein each port includes a Gigabit input channel and a Gigabit output channel. Each of the sixteen Gigabit Ethernet ports couple to a Gigabit transceiver on the extended interconnect board.

The paragraph beginning at page 23, line 28, has been amended as follows:

By way of a specific example, board 136 of FIGURE 5 includes ASICs 402-408. ASIC 402 is subdivided into [to] two logical halves 402a and 402b. Similarly, ASIC 404 is subdivided into logical halves 404a and 404b; ASIC 406 is subdivided into logical halves 406a and 406b; and ASIC 408 is subdivided into logical halves 408a and 408b. ASIC 402 includes Gigabit Ethernet ports 0a-15a, on half 402a, and 0b-15b on half 402b. Ports 0a-15a couple to transceivers 0-15 on board 136, and ports 0b-15b couple to transceivers 16-31. Gigabit ports 0a-15a and 0b-15b of [ASICS] ASICs 404-408 successively couple to remaining transceivers 32-127. Gigabit I/O ports of ASICs 410-416 and 418-424 couple to one hundred and twenty-eight transceivers of boards 138 and 140, respectively, in an identical fashion to that described with respect to [ASICS] ASICs 402-404 on board 136.

The paragraph beginning at page 27, line 23, has been amended as follows:

As discussed above in the Summary of the Invention, and as discussed in further detail below, according to a preferred embodiment, the invention employs a plurality of memory storage queues / buffers to aid in the efficient transfer of information. It should be noted that the terms queue and buffer are used interchangeably. The dual-port RAM 730 provides an output

queue for each transceiver of sets 704 and [706] 708. More specifically, information cells coupled into board 218 to be transferred to a line card 202-204 of local interconnect 102, are first written into buffer memory at an address which is written into an output queue. Free list memory 742 provides a list of available buffer memory addresses. There is a reference counter 744 for each of the 1536 buffers in the dual port RAM 730. Reference counter 744 contains the number of output queues to which the contents of the respective buffers are to be sent. A reference counter 744 decrements in response to information being read from an associated buffer. When the reference counter reaches zero, the address of the buffer is returned to free list 743. In this way, the ASIC 224 can track the available buffer locations associated with each transceiver. Information written to buffer memory is subsequently transferred to one of the output shift and hold registers 720 or 728, and held there until an internal time slot arrives in which the destination address lookup can be performed, the read from the free list memory 742 can be performed, the write to the buffer memory can be performed, and the write to the output queue can be performed.

IN THE CLAIMS:

The claims have been amended as follows:

1. (Amended) An interconnect network for operation within a communication node, said network comprising[,]:

a plurality of local line card modules configured to process information received at a plurality of speeds and formatted according to a plurality of protocols,

a selectable number of local interconnect modules connected to the local line card modules and located proximate to each other and each [having] including local transfer elements for transferring information between a plurality of local I/O channels and for transferring information between said plurality of local I/O channels and a plurality of non-local I/O channels, and

an expanded interconnect module located proximate to said local interconnect modules and [having] including coupling means for electrically coupling to said non-local I/O channels, and expanded transfer elements for transferring information between said local interconnect modules.

4. (Amended) An interconnect network according to claim 1 further comprising hot-swap means for changing the selected number of said local [communication] interconnect modules included in said interconnect network, while said interconnect network is [operating] transferring information.

9. (Amended) An interconnect network according to claim 7, wherein information coupled into and out of said network has an associated priority, and said network further comprises means for setting said status corresponding to a particular one of said local I/O channels to indicate unavailability for receiving information having a particular priority, in response to said associated queue [of said particular transceiver] reaching a selectable content level.

17. (Amended) An interconnect network according to claim 1, wherein said local I/O channels have associated destination addresses, and said expanded interconnect module includes[,]:

array means for storing path information representative of a plurality of paths through said expanded transfer elements over which information from a first local I/O channel of one of said local interconnect modules can be transferred to a second local I/O channel of another one of said local interconnect modules, and

index means for selecting appropriate path information from said array means, at least partially in response to a destination address of said second local I/O channel.

19. (Amended) An interconnect network according to claim [16] 18, wherein said local and said expanded transfer elements each [include] includes mode control means for selecting whether said transfer element is to be employed in one of said local interconnect modules or in said expanded interconnect module.

20. (Amended) A dynamically scalable communication interconnect comprising[,]:

a selectable number of local interconnects, each [having] including associated transfer elements for transferring information through said associated local interconnect, and

a single expanded interconnect, including elements for coupling to said selected number of local interconnects, and expanded transfer elements for transferring information between said

local interconnects, wherein said selected number of local interconnects can be varied while said expanded interconnect is [operating] transferring information.

21. (Amended) An interconnect network for operation within a communication node, said network comprising[,]:

a selectable number of local interconnect modules each [having] including local transfer elements for transferring information between a plurality of local I/O channels and for transferring information between said plurality of local I/O channels and a plurality of non-local I/O channels, wherein said interconnect network is adapted for transferring information as information cells, each of said cells including groups of information words,

an expanded interconnect module [having] including coupling means for electrically coupling to said non-local I/O channels, and expanded transfer elements for transferring information between said local interconnect modules, and

redundancy generating means for generating an alternative version of information being transferred out of said interconnect network by generating a bit-by-bit "exclusive-or" between pairs of said groups of information words included in an information cell.

22. (Amended) An interconnect network for operation within a communication node, said network comprising[,]:

a selectable number of local interconnect modules each [having] including local transfer elements for transferring information between a plurality of local I/O channels and for

transferring information between said plurality of local I/O channels and a plurality of non-local I/O channels,

an expanded interconnect module [having] including coupling means for electrically coupling to said non-local I/O channels, and expanded transfer elements for transferring information between said local interconnect modules, and

quality of service means for differentiating between information coupled into said local I/O channels based on an associated priority of said information, and for indicating unavailability for receiving information having a particular associated priority on one or more of said local I/O channels.

23. (Amended) An interconnect network for operation within a communication node, said network comprising[,]:

a selectable number of local interconnect modules each [having] including local transfer elements for transferring information between a plurality of local I/O channels and for transferring information between said plurality of local I/O channels and a plurality of non-local I/O channels, and

[an] at least one expanded interconnect module [having] including coupling means for electrically coupling to said non-local I/O channels, and expanded transfer elements for transferring information between said local interconnect modules,

wherein said interconnect network is adapted for transferring information as information cells, and said local and expanded transfer elements further include clumping means for substantially simultaneously transferring a plurality of said information cells.

24. (Amended) A dynamically bandwidth scalable communication node comprising[,]:

a selectable number of local communication modules, each of said local communication modules [having] including a plurality of external communication channels for coupling information into and out of said node, a plurality of internal communication channels for coupling information within said node, and means for coupling information between said external communication channels and said internal communication channels,

a local interconnect module, associated with each of said [selected] selectable number of local communication modules, and [having] including local transfer elements for transferring information between said plurality of internal communication channels of said associated local communication module, and

an expanded interconnect module, including means for coupling to each of said local interconnect modules, and expanded transfer elements for transferring information between said local interconnect modules, thereby enabling transfer of information between external communication channels of different ones of said selectable number of local communication modules.

25. (Amended) A dynamically bandwidth scalable communication node having a modular construction and comprising[,]:

a selectable number of local communication modules, each [module having] of the local communication modules including a plurality of communication channels for transferring information into and out of said node,

a local interconnect module coupled to each of said local communication modules and including local transfer elements for transferring information between said plurality of communication channels, and

an expanded interconnect module [having] including elements for coupling to a plurality of said local interconnect modules, and transfer elements for transferring information between said plurality of local interconnect modules, wherein information can be transferred between communication channels of different ones of said local communication modules.

26. (Amended) A method for transferring information signals between I/O channels of an interconnect network adapted for operation in a communication node, said method comprising: [the steps of,]

coupling information to I/O channels of one or more proximately located local interconnect modules,

transferring information between I/O channels of a particular one of the local interconnect [module] modules in response to a local destination address,

transferring information from one of said local interconnect modules to an I/O channel of a proximately located expanded interconnect module in response to a non-local destination address,

transferring information from said expanded interconnect module to [a] another particular one of said local interconnect modules in response to said non-local destination address, and

scaling bandwidth of said interconnect network by including a selected number of said local interconnect modules in said plurality of local interconnect modules.